Shea, Valois

From: Ex. 6 Personal Privacy (PP)
Sent: Tuesday, May 23, 2017 11:30 PM
To: Shea, Valois
Subject: comments on Dewey-Burdock permit application

Comments on Dewey-Burdock ISM Disposal Well Permit Application

The permit application fails to address the reasonably foreseeable event of a natural or induced earthquake along the Dewey fault, which lies only a mile from the project area. The geologic study prepared for the permit application does not employ best current science. To be specific:

1. The study does not classify the Dewey fault as a capable fault. As nearly as I can determine, the Dewey fault meets at two of the four criteria for a capable fault, only one of which is needed for a fault to be classified as capable. It may meet all four criteria; however, this is difficult to determine because local seismic data are not available to me.

(Definition of capable fault can be found here:

https://www.nrc.gov/reading-rm/doc-collections/cfr/part100/part100-appa.html

Earthquakes of greater than 3.0 magnitude have occurred in the immediate area on July 17, 1920, December 30, 1924, and May 3, 1996. A 3.5 magnitude earthquake east of the town of Custer that occurred on December 12, 2013, may have been associated with the Dewey fault.

Please explain how it was determined that the Dewey fault is not capable.

2. The permit application assumes that movement along the Dewey fault, which is already estimated as having experienced a 440-foot vertical displacement, cannot disrupt "confining" shale strata that are only 20 to 80 feet thick. This assumption is clearly wrong. Nowhere does the permit application address this scenario.

Source: https://www.nps.gov/parkhistory/online_books/geology/publications/bul/1063-G/sec2.htm

What is the basis for the assumption that the movement of the Dewey fault will not cause displacement of the so-called confining strata and mixing of aquifers?

3. The application does not address the possibility of induced earthquakes from the waste-disposal wells needed in the proposed uranium extraction process, nor does it address the likelihood of eventual hydraulic fracturing to extract oil and gas in western Fall River County. According to USGS studies, deep wells used to dispose of wastewater from fracking can cause earthquakes as far as 10 miles from the location of an injection well: "Earthquakes can be induced at distances of 10 miles or more away from the injection point and at significantly greater depths than the injection point." Note that the Dewey Fault is only two miles from the proposed well sites. (USGS website, accessed 5/22/2017.)

http://rapidcityjournal.com/news/local/seismic-crews-want-to-test-up-to-acres-northwest-of/article_2d670e86-f90b-5db4-8bd6-19075034e04e.html

What is the reason for assuming that neither natural nor induced earthquakes can happen in or near the project area and create disruption of confining strata and mixing of underground water bodies?

4. Further, the USGS studies demonstrate that injection wells can cause such earthquakes even without the presence of high-pressure injection. "In operations where engineers pour fluid down the well without added pressure at the wellhead still increase the fluid pressure within the formation and thus can induce earthquakes." (USGS website, accessed 5/22/2017.)

Please explain why it is assumed here that the proposed wells cannot induce earthquakes, given the presence of relatively soft rock strata and geologic faults within and adjacent to the project area.

5. The USGS has developed methods to estimate the risk of such wells causing earthquakes. These methods have not been applied here. (USGS website, accessed 5/22/2017.)

Please clarify whether earthquake risk evaluation methods have been applied here and state the results of such evaluations.

6. The permit application does not incorporate recent studies showing that water moves between aquifers to a much greater degree than previously thought.

http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo2943.html

The permit application assumes that the relatively thin "confining" strata do not allow mixing of water from the various permeable strata. Please re-evaluate in light of this new research or explain why such analysis is not needed here.

7. I also notice that the permit application makes no mention of a fault lying within the project area, which is described in *Stratigraphic and Structural Controls of Uranium Deposits on Long Mountain, South Dakota*, by William A. Braddock, US Geological Survey Bulletin 1063-A, 1957, page 51.

Why was the presence of this fault omitted from the application?

8. Regarding the surface-application alternative. The proposal is to fence the area where contaminated water will be applied to keep out livestock and people. How will you assure that deer and pronghorn do not enter this area and consume grass with high levels of arsenic and radioactive elements, which can then enter the human food chain via hunting and consumption of these animals?

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